

CLAIMS

1. A wavelength filter comprising a grating in which a first portion
extending in X direction on a substrate surface and a second portion
5 composed of a material with a refractive index higher than that of a
material of the first portion and extending in the X direction along the
first portion are alternately arranged in Y direction perpendicular to the
X direction on the substrate surface at a predetermined cycle shorter than
the wavelength of light to be used, wherein the wavelength filter is
10 constituted so that the cross-sectional figure of respective first portions in
the Y direction and perpendicular to the substrate surface is provided
with at least one protruding portion so as to become wider in the width of
Y direction than that of neighboring portions within a predetermined
range of distance apart from the substrate surface by a predetermined
15 distance in Z direction to form plural waveguide layers parallel to the
substrate surface and divided by regions parallel to the substrate surface
in the predetermined range of distance, and that wavelength bands of
light reflected from the plural waveguide layers shift while overlapping
with each other to reflect light with a wavelength band broader than that
20 of light reflected from a single waveguide layer.

2. The wavelength filter according to claim 1 being constituted so
that the wavelength bands of light reflected from the plural waveguide
layers shift while overlapping with each other by altering the
25 predetermined range of distance.

3. The wavelength filter according to claim 1 being constituted so
that the wavelength bands of light reflected from the plural waveguide
layers shift while overlapping with each other by altering average
30 refractive index of the plural waveguide layers.

4. The wavelength filter according to any of claims 1 to 3, wherein the material of the first portion is any of glass, plastic or silicon.

5 5. The wavelength filter according to any of claims 1 to 4, wherein the material of the second portion is any of titanium oxide, magnesium fluoride or silicon oxide.

6. The wavelength filter according to any of claims 1 to 4, wherein
10 the material of the second portion is either germanium or zinc selenide.

7. A method for producing the wavelength filter according to any of claims 1 to 6, comprising the step of plotting the cross-sectional figure by irradiating a beam from the X direction.